SiT8924B

Automotive AEC-Q100 Oscillator

Features

- AEC-Q100 with extended temperature range (-55°C to 125°C)
- Frequencies between 1 MHz and 110 MHz accurate to 6 decimal places
- Supply voltage of 1.8V or 2.25V to 3.63V
- Excellent total frequency stability as low as ±20 ppm
- Industry best G-sensitivity of 0.1 PPB/G
- Low power consumption of 3.8 mA typical at 1.8V
- LVCMOS/LVTTL compatible output
- Industry-standard packages: 2.0 x 1.6, 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0 mm x mm
- RoHS and REACH compliant, Pb-free, Halogen-free and Antimony-free

Applications

- Automotive, extreme temperature and other high-rel electronics
- Infotainment systems, collision detection devices, and in-vehicle networking
- Powertrain control

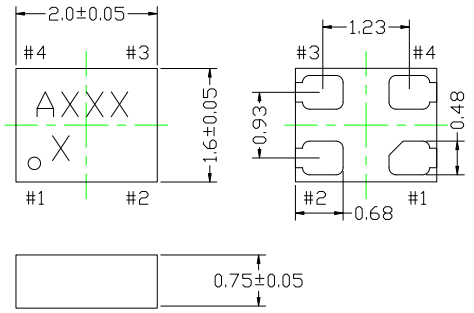
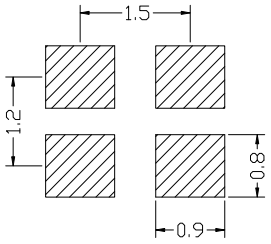
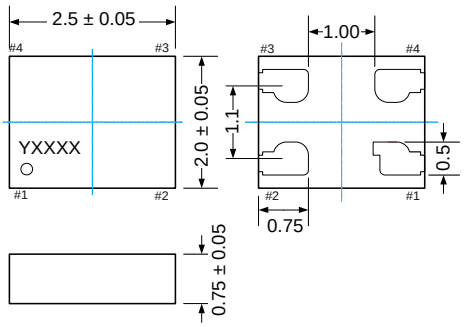
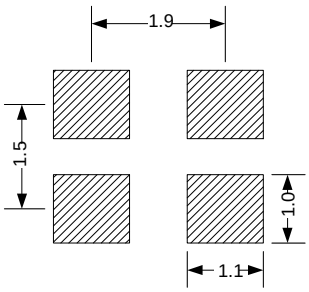
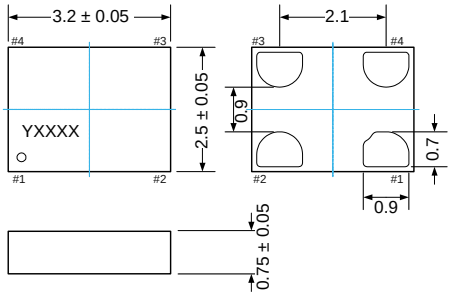
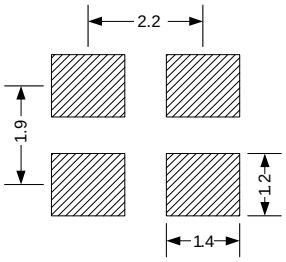
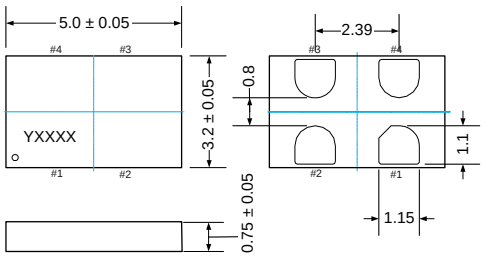
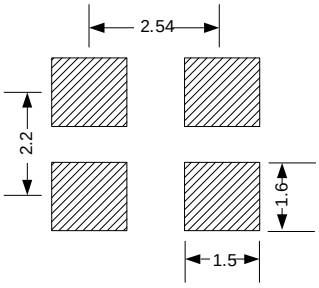
Electrical Characteristics

All Min and Max limits are specified over temperature and rated operating voltage with 15 pF output load unless otherwise stated. Typical values are at 25°C and nominal supply voltage.

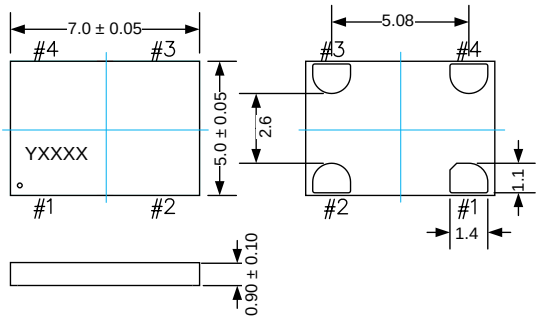
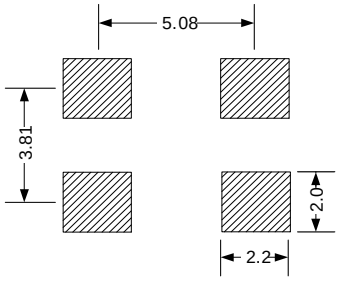
Table 1. Electrical Characteristics

Parameters	Symbol	Min.	Typ.	Max.	Unit	Condition
Frequency Range						
Output Frequency Range	f	1	–	110	MHz	Refer to Table 13 and Table 14 for a list supported frequencies
Frequency Stability and Aging						
Frequency Stability	F_stab	-20	–	+20	ppm	Inclusive of Initial tolerance at 25°C, 1st year aging at 25°C, and variations over operating temperature, rated power supply voltage and load (15 pF ±10%).
		-25	–	+25	ppm	
		-30	–	+30	ppm	
		-50	–	+50	ppm	
Operating Temperature Range						
Operating Temperature Range (ambient)	T_use	-40	–	+85	°C	Industrial, AEC-Q100 Grade 3
		-40	–	+105	°C	Extended Industrial, AEC-Q100 Grade 2
		-40	–	+125	°C	Automotive, AEC-Q100 Grade 1
		-55	–	+125	°C	Extended Temperature, AEC-Q100
Supply Voltage and Current Consumption						
Supply Voltage	Vdd	1.62	1.8	1.98	V	All voltages between 2.25V and 3.63V including 2.5V, 2.8V, 3.0V and 3.3V are supported.
		2.25	–	3.63	V	
Current Consumption	Idd	–	4.0	4.8	mA	No load condition, f = 20 MHz, Vdd = 2.25V to 3.63V
		–	3.8	4.5	mA	No load condition, f = 20 MHz, Vdd = 1.8V
LVCMOS Output Characteristics						
Duty Cycle	DC	45	–	55	%	All Vdds
Rise/Fall Time	Tr, Tf	–	1.5	3	ns	Vdd = 2.25V - 3.63V, 20% - 80%
		–	1.3	2.5	ns	Vdd = 1.8V, 20% - 80%
Output High Voltage	VOH	90%	–	–	Vdd	IOH = -4 mA (Vdd = 3.0V or 3.3V) IOH = -3 mA (Vdd = 2.8V and Vdd = 2.5V) IOH = -2 mA (Vdd = 1.8V)
Output Low Voltage	VOL	–	–	10%	Vdd	IOL = 4 mA (Vdd = 3.0V or 3.3V) IOL = 3 mA (Vdd = 2.8V and Vdd = 2.5V) IOL = 2 mA (Vdd = 1.8V)
Input Characteristics						
Input High Voltage	VIH	70%	–	–	Vdd	Pin 1, OE
Input Low Voltage	VIL	–	–	30%	Vdd	Pin 1, OE
Input Pull-up Impedence	Z_in	–	100	–	kΩ	Pin 1, OE logic high or logic low
Startup and Resume Timing						
Startup Time	T_start	–	–	10	ms	Measured from the time Vdd reaches its rated minimum value
Enable/Disable Time	T_oe	–	–	130	ns	f = 110 MHz. For other frequencies, T_oe = 100 ns + 3 * cycles
Jitter						
RMS Period Jitter	T_jitt	–	1.6	2.5	ps	f = 75 MHz, 2.25V to 3.63V
		–	1.9	3.0	ps	f = 75 MHz, 1.8V
RMS Phase Jitter (random)	T_phj	–	0.5	–	ps	f = 75 MHz, Integration bandwidth = 900 kHz to 7.5 MHz
		–	1.3	–	ps	f = 75 MHz, Integration bandwidth = 12 kHz to 20 MHz

Dimensions and Patterns

Package Size – Dimensions (Unit: mm)[10]	Recommended Land Pattern (Unit: mm)[11]
2.0 x 1.6 x 0.75 mm 	
2.5 x 2.0 x 0.75 mm 	
3.2 x 2.5 x 0.75 mm 	
5.0 x 3.2 x 0.75 mm 	

Dimensions and Patterns

Package Size – Dimensions (Unit: mm)[10]	Recommended Land Pattern (Unit: mm)[11]
7.0 x 5.0 x 0.90 mm 	

Notes:

10. Top marking: Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of "Y" will depend on the assembly location of the device.
11. A capacitor of value 0.1 µF or higher between Vdd and GND is required.